REMARKS/ARGUMENTS

The Applicants have carefully considered this application in connection with the Examiner's Action and respectfully request reconsideration of this application in view of the foregoing amendments and the following remarks.

The Applicants originally submitted Claims 1-15 in the application. Previously, the Applicants amended Claims 1, and 11-15. In this response, the Applicants have amended Claims 1-8, 11, 14 and 15 without new matter to provide greater emphasis on the inventive aspects of the application and to place the Claims in better condition for appeal. Accordingly, Claims 1-15 are currently pending in the application.

I. Rejection of Claims 1-15 for Obviousness-Type Double Patenting

The Examiner has rejected Claims 1-15 under the judicially created doctrine of double patenting over claims 1-18 of U.S. Patent No. 6,289,151 to Kazarinov, *et al.* in view of Harvey, *et al.*, Optics Letters, Vol. 18, No. 2, Jan. 15, 1993, pp. 107-109. The Applicants respectfully traverse the rejection for the reasons set forth below.

Kazarinov generally teaches an all-pass optical filter design employing at least one feedback path, and teaches the generic elements of such a filter, including an input port, output port, and a splitter/combiner. Kazarinov also teaches that each feedback loop requires at least one heater. Each heater requires power and control elements which increase the complexity of the filter. However, Claim 1 of the present application claims an article *comprising* an all-pass optical filter, but with the limitations that 1) the filter is configured using a *single* feedback path, and 2) the input pulse train has a "regular repetition rate," as discussed more fully below, and 3) the free spectral range of the filter is matched to the regular repetition rate of the input optical pulse.

The application uniquely recognizes the utility of an all-pass optical filter, employing a single feedback path, when the free spectral range (FSR) of the filter is matched to the regular repetition rate of the input pulse train. The Specification (pg. 6, lns. 10-12) defines "regular repetition rate" as meaning each pulse repetition frequency of the input pulse train differs from the next highest and lowest frequencies by an equal amount. When this condition is met, the general all-pass optical filter design of Kazarinov can be simplified to use a single feedback path, resulting in reduced complexity and cost.

In his response, the Examiner has construed the embodiment described in Example 3 of Kazarinov as teaching the matching of the FSR of the filter to the regular repetition rate of an input optical pulse (pg. 6, para. 7). This is not what Kazarinov teaches. Kazarinov teaches "The FSR is chosen to be an integer multiple of the system channel spacing."

System channel spacing is fundamentally different from repetition rate, however. As an example, consider two hypothetical systems designed according to the teachings of Kazarinov. The first system has a certain system channel spacing, but an low regular repetition rate (the spacing between adjacent frequencies in the pulse train is large). The other system has the same channel spacing as the first system, but a higher regular repetition rate. Kazarinov would call for the two systems to have identical FSRs, as the channel spacing of the two systems is identical. In contrast, the teachings of the present application would call for the two systems to have quite different FSRs, as the FSR is matched to the regular repetition rate of the input optical pulse. The present application explicitly recognizes this distinction when it distinguishes the two methods of determining the FSR on page 8, lines 20-24, which read in part, "... the FSR is equal to the repetition rate of the optical pulse rather than the full bandwidth of the signal..." (bandwidth and channel

spacing being related concepts). Kazarinov contains no teaching or suggestion that FSR be matched to the regular repetition rate, and this element is not obvious from the cited example of Kazarinov. As such, the Kazarinov does not meet the test of obviousness required for a rejection of the claims under the judicially created doctrine of double patenting.

Accordingly, the Applicants view the presently amended claims in condition for allowance, and respectfully request that the Examiner remove the rejection of Claims 1-15 for obviousness-type double patenting.

II. Rejection of Claims 1-10 and 14 under 35 U.S.C. §103(a)

The Examiner has rejected Claims 1-10 and 14 as being unpatentable over Harvey. With all due respect, the Examiner has misconstrued the teachings of Harvey. Harvey teaches a mode-locked ring laser comprising a Fabry-Perot interferometer, also referred to by Harvey as a high-finesse étalon. The Examiner relies heavily on the mistaken belief that a Fabry-Perot interferometer is an all-pass optical filter (*e.g.*, page 5, fourth paragraph of June 12, 2004 Examiner's response.) An all-pass optical filter is a filter for which the magnitude of the amplitude of a light beam is substantially unchanged (restated, the magnitude of the transfer function, $|H(\omega)|$, equals about unity), but the phase, $\varphi(\omega)$ can be arbitrarily changed. A Fabry-Perot interferometer, in contrast, makes use of reflections between two partially reflecting mirrors to produce multiple offset beams that can interfere with each other. A Fabry-Perot interferometer is in no way an optical all-pass filter.

Additionally, the Examiner asserts that Harvey teaches an input pulse having a "regular repetition rate". Harvey teaches an input with a single pulse frequency of 2.5 GHz, *i.e.*, the pulse frequency is the repetition rate. This input does not constitute a regular repetition rate as defined in the Specification. As discussed above, this phrase is explicitly defined in the Specification as

meaning each pulse repetition frequency of the input pulse train differs from the next highest and lowest frequencies by an equal amount. Accordingly, Harvey does not teach all the elements of independent Claims 1 and 14.

Harvey also fails to suggest each and every element of independent Claims 1 and 14. In particular, Harvey does not teach the use of a pulse train with a regular repetition rate. Harvey is directed towards extending the error free distance of soliton transmission. This is accomplished by the disclosed mode-locked ring laser, designed to produce a repetition rate of 2.5 GHz with stabilized pulse amplitude. However, the article claimed in the present application finds utility in reducing the complexity of a communications system employing an optical time-division multiplexor (OTDM). OTDM systems employ pulse trains of different repetition rates. A person of ordinary skill in the art would not be motivated to look to Harvey to reduce the complexity of an OTDM system, and if such a person did, would find no suggestion in Harvey of an input pulse train with multiple repetition rates, let alone such a pulse train with a regular repetition rate.

Nor is there any suggestion in Harvey of a single feedback loop in an all-pass optical filter, as recited in Claims 1 and 14. As discussed above, Harvey does not employ an all-pass optical filter, and use of such a filter in the ring laser design is not suggested. Clearly, without suggestion of the all-pass optical filter, there can be no suggestion of a single feedback loop in such a filter.

Moreover, the use of multiple pulse repetition rates in Harvey would render the system of Harvey unsatisfactory for its intended purpose. The ring laser of Harvey is designed for increased stability. Harvey goes to some length to ensure that harmonics of the drive frequency (2.5 GHz) coincide with the longitudinal modes of the ring. The physical dimensions of the ring are determined, in part, by the *single* frequency of operation chosen. Using multiple frequencies to

modulate the laser output would clearly defeat this strategy, and result in less stability of the laser output. Thus, Harvey is an improper reference for a *prima facie* case of obviousness with respect to the currently claimed invention.

Accordingly, the Examiner's arguments do not support a *prima facie* case of obviousness of independent Claims 1 and 14 over Harvey, and the claims are allowable. Claims 2-10, which depend directly or indirectly from Claim 1, are then also allowable. The Applicants respectfully request that the examiner remove the rejection of Claims 1-10 and 14 under 35 U.S.C. §103(a).

III. Rejection of Claims 11-13 under 35 U.S.C. §102(b)

The Examiner has rejected Claims 11-13 under 35 U.S.C. §102(b) as being anticipated by Harvey. Independent Claim 11 includes the element of an all-pass optical filter. As discussed above, the Examiner has, unfortunately, misconstrued a Fabry-Perot interferometer to be an all-pass optical filter. This is clearly not the case, and the Applicants respectfully request that the Examiner remove the rejection of Claim 11 and Claims 12-13 which depend from Claim 11.

IV. Conclusion

In view of the foregoing amendments and remarks, the Applicants now view all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicit a Notice of Allowance for Claims 1-15.

The Applicants request the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application.

Respectfully submitted,

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